Abstract Submitted
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Overview of the HIT-SI3 experiment D.A. SUTHERLAND, T.R. JARBOE, B.A. NELSON, B.S. VICTOR, A.C. HOSSACK, K.D. MORGAN, G.J. MARKLIN, C.H. HANSEN, T.K. FRYETT, University of Washington, HIT-SI RESEARCH TEAM — Operations have begun on the upgraded steady-inductive helicity injected torus experiment (HIT-SI3) at the University of Washington. This experiment uses three coplanar inductive helicity injectors to form and sustain a spheromak equilibrium. Toroidal currents of 40 kA have been obtained in helium plasmas with 6 MW of injector power. We seek to further the understanding and development of imposed-dynamo current drive (IDCD) and demonstrate current profile control and externally driven plasma rotation on HIT-SI3. Validated and verified MHD codes (NIMROD and PSI-TET) are being developed using HIT-SI3 as a validation platform. Dynamic neutrals are being added to PSI-TET in an effort to encapsulate their likely important role in HIT-SI3 that is not captured by either code presently. A two-photon absorption laser induced fluorescence (TALIF) system is being implemented to provide spatial neutral profile information that will be compared with PSI-TET. The digital-feedback control system for HIT-SI3 has been upgraded to three integrated Blackfin micro-controller boards per injector. Two boards drive the flux and voltage tank circuits, presently in a pre-programmed manner. The third board monitors the injector current and informs the voltage and flux boards of the presence of plasma, allowing a change in pulse-width duty cycle for the plasma load.

D.A. Sutherland
University of Washington

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